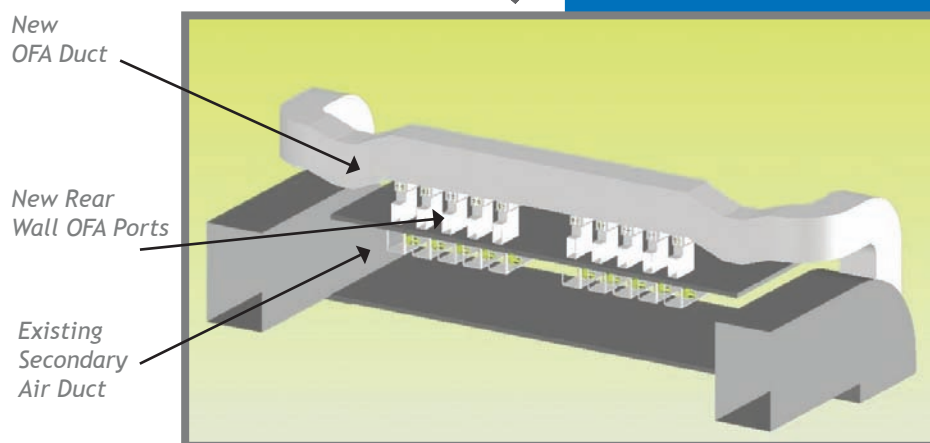


Over-Fire Air (OFA) Systems

Deep-Staging for Maximum NO_x Reduction

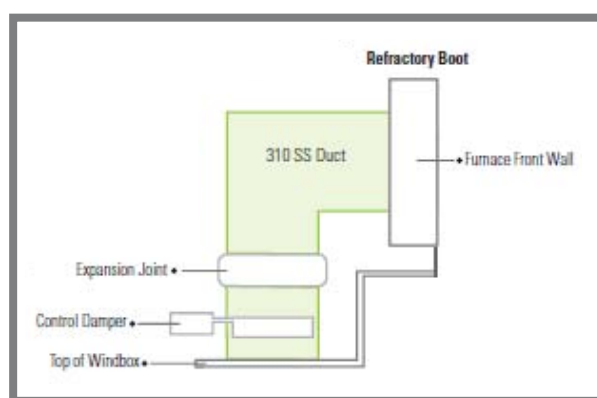
Over-Fire Air (OFA) System

Fuel Tech's Over-Fire-Air (OFA) system deeply stages combustion for enhanced NO_x reductions. Additional NO_x reductions of 35% to 50% are possible on Wall, Tangential, Turbo or Cyclone fired boilers of all fuel types. The unique port design will enhance mixing to limit impact on combustion efficiency.



How Fuel Tech's OFA System Will Reduce NO_x Emissions

Combustion air is diverted from the burners to create a fuel rich zone in the lower furnace. Fuel-bound nitrogen conversion to NO is inhibited on coal and oil fired boilers. Peak flame temperatures are reduced on gas fired boilers to limit thermal NO_x formation. A high momentum air stream intersects the burner combustion gasses in the upper furnace to complete combustion prior to the boiler convective section.



The Hardware

The OFA port is shaped by refractory "boot" with combustion air fed through a 310 SS duct for long life. Automated damper controls allow for tuning through the load range. Full furnace Computational Fluid Dynamics modeling is performed on each project. OFA port sizes

and shaping are determined to maximize combustion air penetration and furnace coverage.

The port utilizes a venturi design with zone disk to accurately control airflow through the OFA port.

- OFA ports fabricated from 1/4" 310 SS material.
- OFA register assemblies fabricated from 1/4" 310 SS material.

Features Include:

- Additional NO_x reductions of 35-50%
- Custom designed port geometry
- Stainless steel construction
- OFA flow control dampers for automatic operation

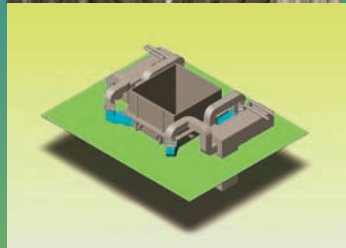


OFA Systems

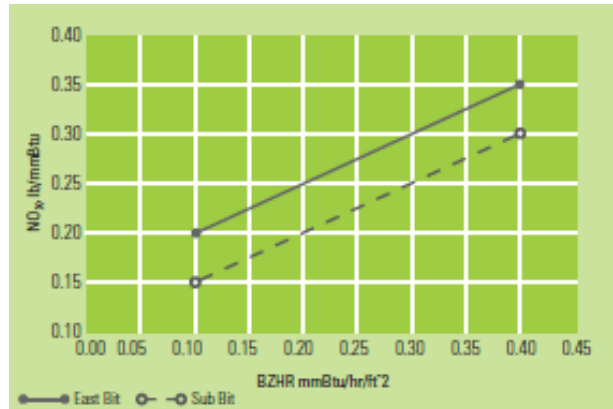
Deep-Staging for Maximum NO_x Reduction



OFA System

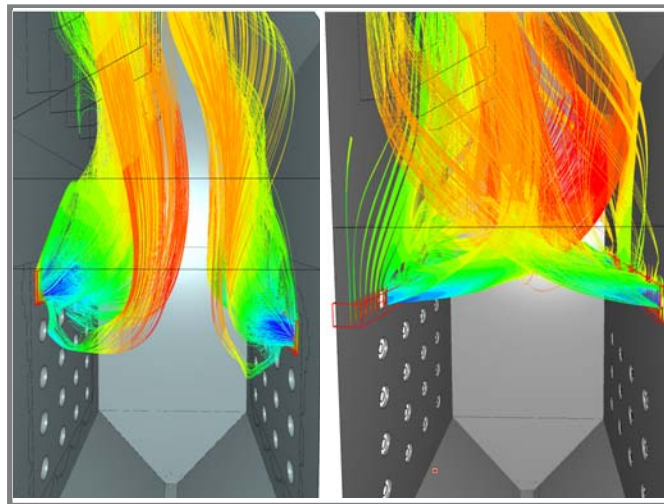


T-Fired OFA System



Fuel Tech Low NO_x Burners & OFA Wall-Fired Coal Boiler NO_x vs. BZHR

This graph illustrates NO_x reduction capabilities for both eastern bituminous and sub bituminous coal. Fuel Tech's Low NO_x burners and OFA systems provide maximum NO_x reduction across a wide range of Burner Zone Heat Release (BZHR) values.



CFD Model of Fuel Tech re-design of customer's OFA system (left) to SOFA system (right).

Over Fire Air NO_x Reduction

Over fire air is injected into the furnace above the top row of burners and completes the combustion of the unburned CO prior to the gases passing through the superheater.

Fuel Tech's modeling expertise and proven field results allow us to guarantee OFA system performance.



Technologies to enable clean efficient energy™

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